Supertemplatic Reduplication and Beyond*

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It is widely believed that reduplication is constrained in certain formally explicit ways. A classic constraint, expressed in the Prosodic Morphology Hypothesis, maintains that reduplicants must conform to invariant affixational templates which are themselves defined “in terms of the authentic units of prosody.” Recent work has shown that in some languages reduplication is atemplatic. All known examples of atemplatic reduplication involve a copying domain that targets part of a prosodic unit. Reduplicants derived in this manner can thus be characterized as subtemplatic. By contrast, in at least three Formosan languages reduplicants are formed by joining a syllable to a preceding coda to form a non-prosodic morphological constituent, and hence constitute examples of what can properly be called ‘supertemplatic’ reduplication. Together these observations make it clear that although there is a general tendency for the form of reduplication to be shaped by considerations of prosody, this tendency can be violated by underextension or overextension of a prosodic domain. Other Austronesian languages violate theoretical expectations on the form of reduplication with regard to notions of markedness or alignment.

Key words: Austronesian languages, reduplication, atemplatic, supertemplatic, prosodic unit, prosodic domain

1. The prosodic morphology hypothesis

In laying the foundations for what is today the most widely accepted interpretation of reduplication, McCarthy and Prince (1986, 1995) defined reduplication as an affixation process in which the affix conforms to an invariant template. Templates acquire their phonemic shape through a process of copying from the base, making allowances for fixed segmentism within the templatic form. Crucially, templates “are defined in terms of the authentic units of prosody: mora (µ), syllable (σ), foot (F), or prosodic word (PrWd)” (1995:318). They call this claim about the range of possible variation in the form of reduplication the ‘Prosodic Morphology Hypothesis.’ (hereafter PMH). A similar view appears in Steriade (1988:79-80), where the copying domain for ‘modified’ (partial) reduplication is assumed to apply only to feet of various kinds, and to light syllables.
It follows from the foregoing definition that potential violations of templatic form are of two types: violations of invariance (sometimes called ‘shape invariance’ in the literature; cf. Kager 1999:195ff), and violations of prosody. Invariance is violated by reduplicative allomorphy where the allomorphs differ in prosodic shape even though they match the shape of general prosodic templates in the language. Violations of prosody are encountered wherever the reduplicant is a phoneme string that is not coterminous with a mora, syllable, or foot.

Gafos (1998), drawing on data published by Benjamin (1976), has shown that in the northern dialect of Temiar, an Austroasiatic language of Malaya, the simulfactive and continuative aspects of verbs are formed by patterns of what he calls ‘a-templatic reduplication’. In the simulfactive of biconsonantal verbs, monosyllabic bases are prefixed by Ca-reduplication (reduplicants appear in boldface): kćcw ‘to call’ (base): kća.ćcw ‘to call’ (simulfactive), gćl ‘sit down’ (base): ga.gćl ‘sit down’ (simulfactive), rec ‘eat’ (base): ra.rec ‘eat’ (simulfactive), etc. In the continuative, monosyllabic bases are prefixed by copying both base consonants, hence kćw.kćcw, gl.gćl, re.rec (with nasal replacement due to a general constraint against voiceless stops as codas of prefinal syllables). For triconsonantal verbs the surface pattern diverges from that of biconsonantal verbs in that the simulfactive is formed by apparent infixation of the fixed vowel a, and the continuative by apparent infixation of the last base consonant: s.lćg ‘lie down’ (base): sa.lćg ‘lie down’ (simulfactive), s.g.ćl ‘lie down’ (continuative), s.maćp ‘ask a question’ (base): sa.maćp ‘ask a question’ (simulfactive): sji.maćp ‘ask a question’ (continuative), s.luh ‘to shoot’ (base): sa.luh ‘to shoot’ (simulfactive): sh.luh ‘to shoot’ (continuative). Gafos (1998:522) concludes “It is a striking property of the Temiar affixes that they are realized with copies of isolated segments of the base in various shapes and quantities. The continuative, for instance, copies one or two consonants of the base. No obvious template exists for this affix, and indeed it was shown that no such template is necessary. I now show that even when the shape of the reduplicant is invariant, that fact does not necessarily imply the presence of a template.”

Gafos rejects the templatic status of the reduplicants used to form the simulfactive and continuative aspects of Temiar verbs on two grounds: 1) in his analysis these affixes violate shape invariance, and 2) templates are redundant even for invariant reduplicants if the shape of the affix is fully specified by morpheme structure constraints that operate more generally in the language. Violations of prosody in the formation of the continuative aspect are not mentioned.

In finding cases of a-templatic (hereafter: atemplatic) reduplication Gafos presumably chose to emphasize violations of invariance rather than violations of prosody since in his analysis both the simulfactive and the continuative aspects of Temiar verbs show reduplicative allomorphy, and so violate invariance, whereas only
the continuative aspect violates prosody. By focusing his attention on the invariance requirement he was able to label both reduplicative process at once as atemplatic. However, the invariance requirement itself is surprising. Spaelti (1997) has shown that reduplicative allomorphs (his ‘alloduples of the same reduplicant’) and non-reduplicative allomorphs share basically the same kinds structural relationships. Reduplicative allomorphy is not uncommon, and many potential examples of atemplatic reduplication as defined by Gafos are thus likely to surface as more attempts are made to find them.

Moreover, it is unlikely that the analysis Gafos proposes corresponds with the history of these constructions, since the surface patterns observed today show clear evidence of restructuring. First, it is odd for reduplicative allomorphs to differ in that one is prefixed and the other infixed, unless the affix in question has the shape -VC and is inserted before the first vowel of a base which may or may not begin with a consonant. Yet, according to Gafos Temiar prefix/infix allomorphy is simply an arbitrary convention. To make matters worse, biconsonantal bases take a prefixed reduplicant and triconsonantal bases take an infixed reduplicant in both the simulactive and continuative aspects, which in all other respects appear to be independent constructions. Second, given Gafos’ analysis the prefixed alloduple of the simulactive aspect in biconsonantal bases clearly is reduplicative (with fixed segmentism), while the infixed alloduple of the simulactive in triconsonantal bases is not formed by any copying process --- it is simply an arbitrary segment that happens to be in complementary distribution with a pattern of Ca- reduplication. Finally, according to Gafos the continuative aspect of biconsonantal verbs is formed with a reduplicative prefix which consists of both base consonants, while the continuative aspect of triconsonantal verbs is formed by infixing the terminal consonant. It would be far more plausible historically (and more general synchronically) to posit Ca- reduplication as marking the simulactive aspect of all verbs, and a prefixed copy of the first and last base consonants as marking the continuative aspect of all verbs, hence kɔw: ka.kɔw, s.lɔg: *sa.s.lɔg > sa.lɔg, and kɔɔw: kw.kɔɔw, s.lɔg: *sg.s.lɔg > sg.lɔg. It is thus possible that in a different (and more abstract) synchronic analysis invariance would not be violated, since the reduplicative affix in the simulactive verb sa-lɔg would be a prefix sa-formed by Ca- reduplication, not an infix -a- which has no phonological relationship to the base, and the reduplicative affix in the continuative verb form sg-lɔg would be a prefix sg- formed by copying the first and last consonants of the base, not an infix -g-.

Although this alternative is supported by evidence of historical restructuring, it is difficult to motivate medial cluster reduction synchronically. The proposed cluster reduction in *sg.s.lɔg > sg.lɔg might follow from the observation that clusters of four consonants are disallowed in Temiar, but the cluster reduction in *sa.s.lɔg > sa.lɔg
evidently would have to be analogical. Whatever other reasons might be invoked, however, it is clear that reduplicants which fail to correspond to a recognized unit of prosody ipso facto constitute counter-evidence to the PMH.

Observations with the same empirical content, although not leading to the same conclusion, have been made in the phonological literature for the past two decades. Broselow and McCarthy (1983/1984), for example, noted a number of cases in which infixing reduplication copies a single base consonant, often an obstruent (Levantine Arabic, Temiar, Zuni, Quileute). In languages with a singleton: geminate contrast a single consonant might constitute a unit of prosody (a mora), but in languages without such a contrast it is difficult to see how a copied consonant in isolation can be considered templatic. This paper discusses the same Temiar data which led Gafos (1998) to posit reduplicative atemplaticism, but without drawing the same inference. Since the other cases of single consonant infixal reduplication which are cited by Broselow and McCarthy (1983/1984) do not appear to differ in substance from the Temiar examples cited by Gafos, it is difficult to see why the PMH was proposed in the first place. In the terms adopted by Gafos (1998) consistency would demand that all such patterns of single consonant reduplication be called ‘atemplatic’.

All examples of atemplatic reduplication found in Broselow and McCarthy (1983/1984) specify a copying domain that targets part of a prosodic unit. Although Gafos himself does not make the distinction, reduplicants derived in this manner can be characterized as subtemplatic. Examples of subtemplatic reduplication turn out to be relatively common. Nivens (1993:369), for example, reported a case of reduplicative allomorphy that is governed by stress-sensitivity in the North dialect of West Tarangan (an Austronesian language spoken in the Aru islands of eastern Indonesia). In this language a base with initial stress is reduplicated with a CV(C) prefix, as with *ke: ke-ke ‘wood’, *lɔpay: lɔp-lɔpay ‘cold’, or *epir: ep-epir ‘good.3s’. However, “roots with noninitial stress reduplicate only a single consonant if the syllable immediately prior to the stressed syllable is an open syllable. The consonant reduplicated is the one that directly follows the stressed vowel, whether it is the coda of the stressed syllable or the onset of the following syllable,” as with tapùran: tarpuran ‘middle’, dubêm-na: dumbEm ‘seven’, ga ‘relative’ + let ‘male’: gatlet ‘bachelor’, or *binìk: biknuk ‘ankle’. Likewise, Blevins (2003) has drawn attention to cases of defective foot reduplication in

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1 Benjamin (1976:141ff) is not completely explicit regarding the maximum length of consonant clusters in Temiar, but the fairly abundant material in his long paper is consistent with this statement.
2 Broselow and McCarthy (1983/1984) posit a template consisting of a single consonant for Temiar, but this seems transparently at odds with the claim in McCarthy and Prince (1986, 1995) that affixational templates must correspond to true prosodic units.
Bugotu and Cheke Holo (Solomon Islands) in which an intervocalic consonant is not copied, as with Bugotu ka.lu: kau.ku.lu ‘to stir, knead’, ka.ve: kae.ka.ve ‘to be old (of women)’, or lo.po: loo.lo.po ‘to fold’.

By contrast, at least three Austronesian languages construct reduplicants that are not possible prosodic units by copying portions of adjacent syllables, and hence provide examples of what can be called supertemplatic reduplication. In a fourth language (Agta) the reduplicant, which has the shape -V.C- is a possible syllable, but violates shape invariance both in terms of the insertion algorithm used to form reduplicative infixes, and in terms of secondary adjustments of vowel height that distinguish high vowels from low vowels within the reduplicative template. The evidence for these claims will be given below. First, however, it will be useful to discuss a fundamental background property of the base-reduplicant relationship in many Austronesian languages.

2. Base-1 and Base-2

In discussions of reduplication the term ‘base’ is commonly used in two distinct senses. Let us call the independent base ‘Base-1’, and the affixed base ‘Base-2’. Then in reduplication both Base-2 and the reduplicant are ‘copied’ from Base-1. In reduplication it is expected that the number of segments in the base (= Base-2) will equal or exceed that in the reduplicant, since otherwise reduplication cannot be stated in straightforward terms as a copying process. In a number of the Formosan languages, however, the reduplicant contains a final consonant copied from Base-1 that is not present in Base-2. This relationship can be illustrated by Thao, where suffixal reduplication marks intensity in stative verbs, but duration or repetition in dynamic verbs:

<table>
<thead>
<tr>
<th>(Affixed) base</th>
<th>Suffixal reduplication</th>
</tr>
</thead>
<tbody>
<tr>
<td>ma-cakaw ‘greedy, gluttonous’</td>
<td>ma-caka-cakaw ‘very greedy’</td>
</tr>
<tr>
<td>ma-dumuc ‘soft, as tofu’</td>
<td>ma-dumu-dumuc ‘very soft’</td>
</tr>
<tr>
<td>ma-kupur ‘hairy’</td>
<td>ma-kupu-kupur ‘extremely hairy’</td>
</tr>
<tr>
<td>ma-tamaz ‘insipid’</td>
<td>ma-tama-tamaz ‘completely tasteless’</td>
</tr>
<tr>
<td>ma-cuaw ‘very, excessively’</td>
<td>pish-cua-cuaw ‘do something to excess’</td>
</tr>
<tr>
<td>dauk ‘still, quiet’</td>
<td>mi-dau-dauk ‘keep still as in hiding’</td>
</tr>
<tr>
<td>fariw ‘buy’</td>
<td>fari-fariw ‘go shopping’</td>
</tr>
<tr>
<td>kaush ‘water scoop’</td>
<td>kau-kaush ‘scoop repeatedly, as water’</td>
</tr>
<tr>
<td>k-m-upit ‘extinguish a fire’</td>
<td>ma-kupi-kupit ‘will die out, of a fire’</td>
</tr>
<tr>
<td>raus ‘downhill’</td>
<td>mana-rau-raus ‘keep going downhill’</td>
</tr>
<tr>
<td>q-un-riu? ‘to steal’</td>
<td>q-un-riu-riu? ‘steal habitually or constantly’</td>
</tr>
<tr>
<td>qata-ripic ‘catch a glimpse of s.t.’</td>
<td>qata-ripi-ripic ‘have wandering eyes’</td>
</tr>
</tbody>
</table>
If the database were limited to disyllables that lack a medial consonant cluster it would be possible to conclude that *ma-caka-cakaw*, *ma-dumu-dumuc*, *ma-kupu-kupur* and the like exemplify a process of prefixal reduplication, that is, that *caka-, dumu-, kupu-*, etc. are reduplicants rather than examples of Base-2. But in polysyllables, or disyllables that begin with a consonant cluster, what appears to be the same morphological process copies the rightmost foot of Base-1.3

(2) (Affixed) base Suffixal foot reduplication

<table>
<thead>
<tr>
<th>Base</th>
<th>Suffixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>k-m-alawa</td>
<td>k-m-alawa-lawa ‘build, construct’</td>
</tr>
<tr>
<td>mashiwan</td>
<td>mashiwa-shiwan ‘change clothes’</td>
</tr>
<tr>
<td>mataqaz</td>
<td>mataqa-taqaz ‘carry with shoulder pole’</td>
</tr>
<tr>
<td>miarain</td>
<td>miarai-rain ‘often; do often’</td>
</tr>
<tr>
<td>palhatuzus</td>
<td>malhatuzu-tuzus ‘point at’</td>
</tr>
<tr>
<td>ma-quliush</td>
<td>mia-quli-liush ‘long; stretch out’</td>
</tr>
<tr>
<td>pa-shnara</td>
<td>pa-shnara-nara ‘to burn, as fields’</td>
</tr>
<tr>
<td>t-un-ruquz</td>
<td>t-un-ruqu-ruquz ‘to work with a chisel’</td>
</tr>
</tbody>
</table>

Most of these verbs are dynamic, and reduplication adds an element of repetition or duration to the meaning of the base: *k-m-alawa* ‘build, construct’, but *k-m-alawa-lawa* ‘work continuously in building something’, *pashiwan* ‘change of clothes’: *mashiwan* ‘to change clothes’, but *mashiwa-shiwan* ‘change clothes often or repeatedly’, *miarain* ‘often’, but *miarai-rain* ‘do often or repeatedly, do nothing but’, *shnara* ‘ignite, catch fire’: *pa-shnara* ‘to burn, as fields before planting’, but *pa-shnara-nara* ‘burn over and over’, etc. Since reduplication is formally and functionally indistinguishable in (1) and (2), there is no obvious reason to treat the two sets of data as involving different word-formation processes. But if this is true, it follows that in forms like *ma-caka-cakaw* or *ma-dumu-dumuc* the order of morphemes is prefix-Base2-reduplicant, and that the ‘copied’ base contains less phonemic material than the reduplicant.

3. Supertemplatic reduplication

Before proceeding one other clarification is needed. With a minor complication to be noted below, all cases of atemplatic reduplication reported to date are subtemplatic.

3 For reasons that remain unclear, but which are irrelevant to the present argument, virtually all examples of rightward reduplication in trisyllabic bases appear to be confined to dynamic verbs.
In subtemplatic reduplication the deviation from theory-driven expectation is by shortfall: a reduplicant is formed by copying less than a full prosodic unit (syllable or foot). By contrast, the following examples form a reduplicant by fusing a syllable coda and a syllable. Supertemplatic reduplication appears to be far less common than subtemplatic reduplication. All languages in which it is attested (Thao, Paiwan, Amis) are Austronesian, but there is no a priori reason to believe that it is restricted to members of this language family.

Hayes and Abad (1989:356ff) have described contrasting patterns of ‘light’ and ‘heavy’ syllable reduplication in Ilokano. Light reduplication copies “the initial consonant or cluster of the stem, plus the following vowel,” as in liyêt ‘perspiration’: si-li-liyêt ‘covered with perspiration’, bunêg ‘k.o. knife’: si-bu-bunêg ‘carrying a buneng’, pandilîg ‘skirt’: si-pa-pandilîg ‘wearing a skirt’, or trabâho ‘to work’: ?agintra-trabâho ‘pretend to work’. Heavy reduplication, by contrast, “most often copies the initial consonant or consonants of the stem, plus a vowel, plus the next consonant,” as in kaldîg ‘goat’: kal-kaldîg ‘goats’, pûsa ‘cat’: pus-pûsa ‘cats’, or sâjît ‘to cry’: ?agsaaj-sâjît ‘is crying’. From the standpoint of what is copied both heavy syllable reduplication and supertemplatic reduplication can be seen as chimerical, since they cobble together reduplicants from fragments of different prosodic units, an open syllable plus a following onset in the case of heavy syllable reduplication, and any syllable plus a preceding coda in the case of supertemplatic reduplication. What is critical to the PMH, however, is that the outcome of reduplication be a prosodic unit in the language. Both light and heavy syllable reduplication in Ilokano produce reduplicants that conform to the syllable canons of the language. Similar patterns of heavy syllable reduplication have been noted for other languages of northern Luzon, and for Saisiat in northwest Taiwan. By contrast, in the three Formosan languages that follow the reduplicant generally is not a possible prosodic unit.

3.1 Thao

Chang (1998) showed that in Thao suffixal (called ‘rightward’) reduplication copies the -C.CV(C) sequence of CVC.CV(C) morphemes, if the two syllables are not identical (bases such as hurhur ‘to bark’ or shishi ‘to shake’ undergo Ca- reduplication: ma-ha-hurhur ‘bark repeatedly’, sha-shishi ‘shake repeatedly’). Examples, with reduplicants in boldface and syllable boundaries marked by a period, include:

4 The form t-i-n-ap.? a-p.?a-p.?an ‘was patched many times’ shows triplication of the base. For other examples of this kind cf. Blust (2001).
(3) (Affixed) Base  Suffixal reduplication
m-ar.faz ‘to fly’  m-ar.fa-r.faz ‘keep flying around’
m-ar.muz ‘to dive’  m-ar.mu-r.muz ‘dive repeatedly’
ma.-par.fu ‘to wrestle’  ma.-par.fu-r.fu ‘wrestle repeatedly’
par.bu ‘to bake’  par.bu-r.bu.-an ‘place for baking’
tap.an ‘a patch’  t-i.n-ap.-a-p.-a-p. an ‘was patched repeatedly’
siŋ.ki ‘to kneel’  siŋ.ŋ.ki ‘keep kneeling’
lun.duz ‘straight’  mi.a.-lun.du-n.duz ‘go in a straight line’
ram.bak ‘open mouth’  mi.a.-ram.ba-m.bak ‘open the mouth wide’

Unlike most Austronesian languages Thao permits a wide range of syllable-initial consonant clusters (qnuan ‘carabao; cow’, tnaq ‘hold back, control one’s appetite or impulses’, tqir ‘take offense’, etc.). However, tautosyllabic consonant clusters may not contain an initial sonorant, nor a glottal stop as the second member (Blust 2003:20). A similar pattern of suffixal reduplication is seen in CVCCV(C) bases in which the consonant cluster is possible word-initially, and informant reaction suggested that in such cases the syllabification is ambivalent. Forms such as cpiq ‘thresh grain’ or qpit ‘pinch’, however, are unambiguously monosyllabic, as they undergo automatic bimoraic lengthening. Reduplications of such bases therefore have the form cpi.cpiq ‘beat repeatedly in threshing grain’, or q-um.-pi.-qpit ‘pinch repeatedly’, and imply a similar interpretation for the examples in (4):5

(4) (Affixed) base  Suffixal reduplication
bu.qnur ‘anger’  mi.a.-bu.qnu.-qnur ‘be irritable’
k-m-a.-qnish ‘fillip’  k-m-a.-qni.-qnish ‘fillip repeatedly’
ma.-ku.tnir ‘hard’  mi.a.-ku.tni.tnir ‘harden’
mu.-ptuq ‘collapse’  mu.-ptu.-ptuq ‘fall apart repeatedly’
pa.tqal ‘a mark’  pa.tqa.-tqa.l-an ‘put marks on something’
ta.qnar ‘at rest’  mi.a.-ta.qna.-qnar ‘doze or relax’

5 A few Thao bases contain triliteral consonant clusters medially, as with an.qtu ‘contemplate’, or m-iŋ.kmi ‘grasp in one hand’. When such bases are reduplicated only the last two consonants of the cluster are copied: an.qtu.-qtu ‘think about’, iŋ.kmi.-kmi.r-an ‘be rolled into a ball in one hand (as rice when eating)’. While the copied portion of such bases does correspond to a syllable, the alignment with a prosodic unit in these cases appears to be fortuitous, since it is simply another instance of the general pattern of -CCV(C) reduplication, regardless of syllable boundary.
In principle the data in (3) or (4) could be analyzed as containing a reduplicative infix (hence *m-ar.fa*[r.fa]z, *ma-ki[kalhi]kalhi, *mia-qu[liu]liush, etc.). However, nothing would be gained from this analysis, and the reduplicant in bases that contain a medial consonant cluster with an initial sonorant would still not be a possible prosodic unit. In short, suffixal reduplication in Thao copies neither a mora, a syllable nor a foot, but rather a syllable preceded by a syllable coda (in suffixed forms such as *pat.qa-t.qa.l-an* the reduplicant may contain portions of *three* dismembered syllables, but this is a result of resyllabification, not a property of the base). In some cases this phoneme sequence is not a possible prosodic unit, as in (3), while in others it is, as in (4). Historically, suffixal reduplication apparently copied a foot, but subsequent loss of schwa in the environment VC__CV reduced this to a -CCVC sequence that then underwent prosody-destroying resyllabification. Synchronically, however, such an analysis is untenable.

Until now Thao is the only language for which such a theoretically unexpected copying process has been reported. However, as Chang pointed out at the conclusion of her paper, a similar pattern of suffixal reduplication is found in other Formosan languages. Since some of these languages also permit a variety of medial consonant clusters it might be anticipated that the theoretical anomaly found in Thao will be echoed in other languages once better descriptive data become available.

### 3.2 Central Amis

The expectation that Thao is not unique in having a pattern of supertemplatic reduplication for bases that contain a medial consonant cluster was confirmed when an opportunity arose to work on Central Amis, where -C.CV(C) reduplication marking intensity or all-inclusiveness was found to be fairly productive with stative verbs. As in Thao, this pattern is in complementary distribution with suffixal foot reduplication (Part A). Relevant examples collected to date include the following:\(^6\)

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\(^6\) /q/ is a glottal stop syllable-initially, but an epiglottal pharyngeal stop syllable-finally (Edmondson, Esling, Harris and Huang 2005). The data was collected in a Field Methods course taught at National Chengchi University in Taipei during Spring, 2002. The speaker was Mr. Mayaw Kulas, born in 1942 in the village of Cenan, Hualien county, and raised after age four in the Amis village of Anton.
Unlike Thao, Amis permits no word-initial consonant clusters (Fey 1986 writes initial clusters, but this is only a convention for representing phonemic schwa by zero). However, like Thao it allows a number of medial consonant clusters, both in historically reduplicated monosyllables such as mi-koskos < PAN *kuSkuS ‘scrape, scratch’, and in morphemes that do not contain two identical syllables. Stress is final in citation forms, but penultimate in phrasal context. The Amis syllable canon is CVC, and the reduplicants in (5) thus cannot satisfy any known prosodic template. Apart from these forms three others were elicited which show irregular patterns of reduplication: aŋ.cep ‘smell of burnt rice’: aŋ.ce-m.cep ‘strong odor of burnt rice’, aŋ.sit ‘smell of burnt hair’: aŋ.si-n.sit ‘strong odor of burnt hair’, aŋ.tol ‘smell of something dead’: aŋ.to-l.tol ‘strong odor of something dead’. These forms exemplify apparent -C.CV(C) reduplication, but show irregularities in the onset of the reduplicant, suggesting that they probably were recalled incorrectly (three weeks later the first two were given as aŋ.ce-p.cep and aŋ.si-y.sit respectively). This would not be entirely surprising, since it is likely that words with these meanings would have low text frequency. Such errors, however, suggest that the pattern in -C.CV(C) reduplication is not well generalized in the mind of at least this speaker of Central Amis (who is an urbanite who left his natal community many years ago).
3.3 Southern Paiwan

Zeitoun (n.d.) describes reciprocal constructions in several Formosan languages, including Southern Paiwan, Puyuma and Rukai. Her material for Southern Paiwan shows a distinction of dual and plural participants as follows (I have supplied relevant syllable boundaries, marked with a period, but have left her morpheme boundaries intact; L = voiced palatal lateral, tj = voiceless palatal affricate, D = voiced retroflex stop):

(6) Stem Dual Plural
    panaq ma.-pa.-pa.naq ma.-pa.-pa.na.-pa.naq ‘shoot’
    gecel ma.-ga.-ge.cel ma.-pa.-ge.ce.-ge.cel ‘pinch’
    kakeLaŋ maŋ.-ʔa.-ka.ke.Laŋ maŋ.-ʔa-ka.ke.La.-ke.Laŋ ‘know’
    bulay maŋ.-ʔa-bu.lay maŋ.-ʔa-bu.la.-bu.lay ‘good’
    leva maŋ.-ʔa-le.va maŋ.-ʔa-le.va.-le.va ‘happy’
    tjeŋelay maŋ.-ʔa-tje.ŋe.lay maŋ.-ʔa-tje.ŋe.la.-ŋe.lay ‘love’
    galemgem maŋ.-ʔa-ga.lem.gem maŋ.-ʔa-ga.lem.-gem.gem ‘hate’

All bases that lack a medial consonant cluster form the plural of reciprocal verbs by copying the rightmost foot. As in many other Austronesian languages, the copied base (Base-2) omits the terminal consonant. If the same pattern applied to forms with a medial consonant cluster the reciprocal plural of galemgem would be *galemge-lemgem. This form is unattested, however, and the final morpheme boundary proposed by Zeitoun in maŋ?-ʔa-ga.lem.-gem.gem is unjustified, as it deletes an entire syllable from the copied base. If we adhere to a consistent pattern of reduplication that preserves the base (minus the terminal consonant), the only possible segmentation of this form is ga.lem.ge-m.gem. In other words, as with Thao, suffixal foot reduplication is canonically conditioned: bases that lack a medial consonant cluster reduplicate the rightmost foot, while bases with a medial consonant cluster reduplicate the final syllable plus the preceding syllable coda. In both cases we are dealing with alloduplicates of the same reduplicant. What is surprising from the standpoint of general theoretical expectation is that one of these alloduplicates cannot possibly be a prosodic unit.

The Paiwan syllable canon is CVC (tj is a voiceless palatal affricate). The reduplicant in ga.lem.ge-m.gem therefore incorporates a syllable boundary. This reanalyzed form is reproduced below along with additional examples that support the same segmentation; predicted shapes of reduplicated forms are given before the attested
reduplications (all of which mark progressive aspect):\textsuperscript{7}

<table>
<thead>
<tr>
<th>(7)</th>
<th>Base</th>
<th>Predicted shape</th>
<th>Attested shape</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>maisu</td>
<td>maisu-\textit{isu}</td>
<td>maisu-\textit{isu}</td>
<td>pound grains</td>
</tr>
<tr>
<td>qemecegaL</td>
<td>qemecega-\textit{cega}L</td>
<td>qemecega-\textit{cega}L</td>
<td>dibble</td>
<td></td>
</tr>
<tr>
<td>m-alikuvaL</td>
<td>tj-m-alikuva-\textit{kuva}L</td>
<td>tj-m-alikuva-\textit{kuva}L</td>
<td>use a back carrying cloth</td>
<td></td>
</tr>
<tr>
<td>(B)</td>
<td>galemgem</td>
<td>*ga.lem.gem.-lem.gem</td>
<td>ga.lem.gem-\textit{m.gem}</td>
<td>hate</td>
</tr>
<tr>
<td>kinemnem</td>
<td>*ki.nem.ne.-nem.nem</td>
<td>ki.nem.ne-\textit{m.nem}</td>
<td>think</td>
<td></td>
</tr>
<tr>
<td>ma-lu\textit{lj}</td>
<td>*ma.-\textit{lu}.\textit{lj}.\textit{lu}.\textit{lj}</td>
<td>ma.-\textit{lu}.\textit{lj}.\textit{\textit{&amp;}.\textit{lj}}</td>
<td>land on</td>
<td></td>
</tr>
<tr>
<td>mi-\textit{ger}</td>
<td>*mi.-\textit{ger}.\textit{ge}.-\textit{ger}.\textit{ger}</td>
<td>mi.-\textit{ger}.\textit{ge}-\textit{r.}\textit{ger}</td>
<td>shiver, shake</td>
<td></td>
</tr>
<tr>
<td>c-em-ipcip</td>
<td>*c-em-\textit{ic}.\textit{ci}.-\textit{cip}.\textit{cip}</td>
<td>c-em.-\textit{ic}.\textit{ci}-\textit{p.cip}</td>
<td>brush away</td>
<td></td>
</tr>
<tr>
<td>g-em-uc\textit{guc}</td>
<td>*g-em-\textit{uc}.\textit{gu}.-\textit{guc}.\textit{guc}</td>
<td>g-em-\textit{uc}.\textit{gu}-\textit{c.guc}</td>
<td>scratch an itch</td>
<td></td>
</tr>
<tr>
<td>k-em-it\textit{ij} \textit{tij}</td>
<td>*k-em-it\textit{j}.\textit{ki}.-\textit{ti}.\textit{j}.\textit{kitj}</td>
<td>k-em-it\textit{j}.\textit{ki}.-\textit{tj}.\textit{kitj}</td>
<td>mince, chop</td>
<td></td>
</tr>
<tr>
<td>pa-cekcek</td>
<td>*pa.-cek.\textit{ce}.-cek.\textit{cek}</td>
<td>pa.-cek.\textit{ce}-\textit{k.cek}</td>
<td>pierce</td>
<td></td>
</tr>
<tr>
<td>d-ar-uqduq</td>
<td>*d-ar-uq.du.-duq.duq</td>
<td>d-ar-uq.du.-\textit{duq.duq}</td>
<td>shake s.t.</td>
<td></td>
</tr>
<tr>
<td>b-en-usbus</td>
<td>*b-em-us\textit{bu}.-\textit{bus}.\textit{bus}</td>
<td>b-em-us\textit{bu}-\textit{s.bus}</td>
<td>drizzle (rain)</td>
<td></td>
</tr>
<tr>
<td>pa-tjubtjub</td>
<td>*pa.-tjub.tju.-tjub.tjub</td>
<td>pa.-tjub.tju.-\textit{tjub.tjub}</td>
<td>blow horn</td>
<td></td>
</tr>
<tr>
<td>c-em-uc\textit{gug}</td>
<td>*c-em-\textit{uc}.\textit{gu}.-\textit{cug}.\textit{gug}</td>
<td>c-em-\textit{uc}.\textit{gu}.-\textit{c.gug}</td>
<td>knock on</td>
<td></td>
</tr>
<tr>
<td>s-em-avsav</td>
<td>*s-em-av.sa.-sav.sav</td>
<td>s-em-av.sa.-\textit{v.sav}</td>
<td>spread out</td>
<td></td>
</tr>
<tr>
<td>pa-kezkez</td>
<td>*pa.-kez.\textit{ke}.-kez.\textit{kez}</td>
<td>pa.-kez.\textit{ke}-\textit{z.kez}</td>
<td>to lock</td>
<td></td>
</tr>
</tbody>
</table>

Lu (n.d.) attributes the attested shapes in (7B) to “right heavy syllable reduplication,” holds that the morpheme boundaries should be redrawn as \textit{ga.lem.gem.-gem}, etc., and maintains that the coda-deletion in (6) and (7A) is suspended in bases with more than one heavy syllable. This analysis is problematic for a number of reasons. First, the three most important examples cited as support for his view are \textit{pacu-cun} ‘see’: \textit{pacu-cun} ‘be seeing’, \textit{k-em-an} ‘eat’: \textit{k-em-a-kan} ‘be eating’, and \textit{kinemnem} ‘think’: \textit{ki-}

\textsuperscript{7} Data represents the Mudan subdialect. In Southern Paiwan stress is penultimate, as is generally the case in Thao. Unlike Thao and Amis, however, Southern Paiwan permits medial consonant clusters only in sequences of two identical syllables (\textit{lj} is a voiceless palatal affricate). I am indebted to Elizabeth Zeitoun, her Paiwan research assistant Kivi Malaliu and Kivi’s father Valjeluk Mavaliu for responding to my request to supply additional examples of suffixal reduplication. I have made some changes in the original orthography which do not materially affect the discussion, most notably the use of \textit{e} for schwa.
nemnem-nem ‘be thinking’. However, Ferrell (1982) gives the first of these as pa-cún. Since both cun and kan are monosyllables neither pa-cu-cún nor k-em-a-kán provides evidence for syllable reduplication as opposed to foot reduplication. Second, Lu’s analysis posits a pattern of suffixal syllable reduplication that is unknown in Formosan languages, and rare elsewhere in the Austronesian language family. Third, there is no obvious reason why coda-deletion would be suspended just where the result is a sequence of three heavy syllables, since such forms are rare or nonexistent as lexical bases. Fourth, the examples in (6) and (7A) show that in bases lacking a consonant cluster the template used to mark progressive aspect, like that used to mark plurality of participants, is a foot, not a syllable. Since suffixal foot reduplication and –C.CV(C) reduplication are in complementary distribution, they can be considered reduplicative allomorphs, or ‘alloduples’ of the same reduplication pattern in the terms suggested by Spaelti (1997). Essentially, Lu’s analysis attempts to exploit an ambiguity so as to avoid an interpretation that is at odds with accepted theory. Since Paiwan consonant clusters occur only in lexicalized reduplications the form of suffixal reduplication (syllable vs. foot) in CVCCVC bases is superficially indeterminate. By positing syllable reduplication rather than foot reduplication the residue is an apparently intact base in Southern Paiwan. In Thao or Amis, however, this interpretation is impossible, as seen in (1) - (5). Since all three languages show similar canonically conditioned allomorphy in suffixal reduplication it is clear that Lu’s analysis of Paiwan misses a generalization common to the reduplication patterns of several Formosan languages, and fails to see that all of these languages violate shape invariance, since supertemplatic reduplication clearly is an alloduple of suffixal foot reduplication.

Finally, direct elicitation turned up the observation that younger speakers of Paiwan commonly break up consonant clusters through schwa epenthesis. Preliminary checking suggests that this is true of all consonant clusters. Whereas speakers born c. 1940 use ga.lem.ge-m.gem ‘to hate’, g-e.m-uc.gu-c.guc ‘scratch an itch’, pa.-cek.ce-k.cek ‘pierce’, or pa.-kez.ke-z.kez ‘to lock’, for example, speakers born c. 1970 instead use g-a.l-e.m.e.g.gem, g-e.m-u.c.e.gu-ce.guc, pa.-ce.ke.ce.-ke.cek or pa.-ke.ze.ke.-ze.kez. Younger speakers of Southern Paiwan have in effect reinstated the requirement that the reduplicant be a prosodic unit, although it is by no means clear that this was anything other than an accidental by-product of the elimination of surface consonant clusters. However this issue is resolved, these innovative forms reinforce the impression that the -C.CVC reduplicant is in some sense equivalent to a foot.

Despite their close typological similarity, it is clear that the patterns of supertemplatic reduplication in Thao, Southern Paiwan and Central Amis are products of independent historical change. First, since Proto-Austronesian permitted tautomorphemic consonant clusters only in lexicalized reduplications, the pattern of copying
-C.CV(C) in suffixal reduplications could not be inherited from PAN. Second, since Thao, Paiwan and Amis belong to three different primary branches of the Austronesian language family (Blust 1999), the use of non-prosodic reduplicants could not be inherited from an exclusive common ancestor. Both Thao and Amis have lost unstressed vowels, usually the reflex of PAN *e (schwa) in the environment VC__CV, producing many of the attested medial consonant clusters. This historical fact suggests that at least some instances of -C.CV(C) reduplication in these languages may have arisen from an earlier pattern of suffixal foot reduplication which copied -Ce.CV(C). However, this is not true of Paiwan, which preserves schwa in the environment VC__CV, and which never had a medial vowel in forms such as g-e.m-em.gem ‘grasp in fist’: g-e.m-em,ge-m.gem ‘keep grasping in the fist’ (PAN *gemgem ‘fist, hold in the closed hand’).  

3.4 The history of supertemplatic reduplication

The unusual synchronic situation found in languages such as Thao, Central Amis and Southern Paiwan evidently was not innovated in this form. Rather, there is a diachronic basis for the synchronous allomorphy of supertemplatic reduplication and suffixal foot reduplication, supporting the view that synchronic sound patterns, whether common or rare, are ultimately products of historical change that tends overwhelmingly to be phonetically motivated (Blevins 2004). Both of these patterns of reduplication began as foot reduplication of the following form, where e = PAN *e (schwa), and V = any other vowel:

<table>
<thead>
<tr>
<th>Type</th>
<th>Base</th>
<th>Base-reduplicant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(C₁V)C₂VC₃VC₄</td>
<td>(C₁V)C₂VC₃V-C₂VC₃VC₄</td>
</tr>
<tr>
<td>2</td>
<td>(C₁V)C₂eC₃VC₄</td>
<td>(C₁V)C₂eC₃V-C₂eC₃VC₄</td>
</tr>
</tbody>
</table>

Like many AN languages, Thao and Amis underwent ‘schwa syncope’, a historical change that deleted *e \VC.CV: *baqeRuh > Thao faqlu, Amis faqluh ‘new; recent’, *quSeNap > Thao qushzap ‘fish scale’, SuReNa > Thao ulhza, Amis suqla ‘snow’. As a result, trisyllabic Type 2 bases became CVCCVC and the earlier pattern of suffixal foot reduplication may have been influenced by the earlier pattern of foot reduplication.  

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8 For another possible case of supertemplatic reduplication cf. Mokilese an.dip ‘to spit’: an.d-an.dip ‘to be spitting’. Blevins (1996) attempts to reconcile this pattern with the general claims of Optimality Theory, but Harrisson (1976:27ff) makes it quite clear that and is not a possible syllable in Mokilese.
Supertemplatic Reduplication and Beyond

reduplication in which they participated became a pattern of -CCVC reduplication. Since the development of medial consonant clusters in both the base and reduplicant triggered resyllabification \((C_1V.C_2e.C_3VC_4 \text{ to } C_1VC_2.C_3VC_4 \text{ and } C_1V.C_2e.C_3V.-C_2e.C_3VC_4 \text{ to } C_1VC_2.C_3V-C_2.C_3VC_4)\), the reduplicant ceased to be a foot, or for that matter any “authentic unit of prosody.” By contrast Type 1 bases remained unchanged, and the pattern of suffixal foot reduplication in which they participated was likewise unaffected. The upshot was an innovated pattern of reduplicative allomorphy in which suffixal foot reduplication and -C.CVC reduplication came to be in complementary distribution. Paiwan, by contrast, evidently did not undergo schwa syncope: *CuqelaN > tsuqelaL ‘bone’, *qali-medaw > qulimezaw ‘dizzy’, *qapeju > qapedu ‘gall (bladder)’. For this reason there is no known phonological basis for the appearance of supertemplatic reduplication in Paiwan. It is conceivable, but hardly demonstrated, that Paiwan developed this pattern through contact with another language that had it. If contact is not a tenable alternative to purely internal development, then the history of supertemplatic reduplication in Paiwan remains a mystery.

4. Other strikingly divergent patterns

Supertemplatic reduplication in Formosan languages is of interest for two reasons. First, it shows that natural historical change can produce synchronic phonologies that are incompatible with the PMH. Second, whether it contradicted a proposed universal or not, this reduplication pattern would be of interest to anyone concerned with developing a general typology of reduplication patterns, since it apparently is so unusual. Many languages have only the most mundane types of base-copying processes, as CV- reduplication or full reduplication. When a rare type of reduplication is found it should be highlighted so as to expand the database of known reduplication processes and so make progress toward a more complete typology of reduplication processes in natural languages. In this spirit two other strikingly divergent reduplication patterns in Austronesian languages will be noted briefly here, the first in Agta of northern Luzon, Philippines, and the second in Woleaian of the western Caroline islands, Micronesia.

4.1 Central Cagayan Agta

Healey (1960:6ff) has described several reduplication patterns in Central Cagayan Agta, spoken by a small population of Negrito foragers in the Cagayan valley of northern Luzon, Philippines. Two of these are particularly unusual. In most languages fixed segmentism in reduplication is restricted to vowels. To my knowledge no language has been reported in which a reduplicative affix contains one or more
prespecified consonants but no prespecified vowel. Agta allows prespecified consonants together with prespecified vowels, as in the diminutive prefix Cala-, where a reduplicative template copies a foot, but all elements in the reduplicant except the initial consonant are prespecified (in vowel-initial bases a glottal stop, symbolized “q” is automatically inserted between reduplicant and base to break up a phonemic sequence of identical vowels): assaN ‘small’: alaq-assaN ‘very small’, bahuy ‘pig’: bala-bahuy ‘a little pig’, kwák ‘mine’: kwala-kwák ‘my little thing’, pirák ‘money’: pala- pirák ‘a little money’, mag-simul ‘take a mouthful’: mag-sala-simul ‘take a nibble’, tálobag ‘beetle’: tala-tálobag ‘lady-bird’, or wer ‘creek’: wala-wer ‘small creek’.

The second reduplication pattern in Agta is essentially a form of heavy syllable reduplication, but one that has several unusual features. In forming this pattern Healey (1960:10) notes that “The first -VC of some words is reduplicated, if the first vowel is i or u. The vowel of the reduplication is changed from i to e, or from u to o, and the reduplication is infixed after the first syllable, thus: Ci.C-e.C-VC or CuC-oC-VC. There is a possible element of ‘diminutive’ meaning in this reduplication, but the meaning of the word is usually very much changed, and the change is not predictable.” Judging from her own data, Healey’s description of the insertion algorithm for this infix contains an inaccuracy: as seen in the examples below, for bases in which the first vowel is high the infix is invariably inserted before the last vowel, not “after the first syllable.” It thus appears to be the case that although the reduplicant may target a prosodic unit (a VC syllable), the insertion algorithm takes place within a syllable rather than at its edge, and differs from the insertion algorithm of any known non-reduplicative infix in this or other Philippine languages.

The most problematic feature of this pattern is the difficulty of correlating form and meaning, and hence of establishing the reality of a reduplicative morpheme. However, given the unusual form of the reduplicant, which involves both copying of prosodically discontinuous elements and vowel lowering, it is a reasonable supposition that this is a single morphological process. This was assumed by Healey, and her assumption will be adopted here.9 Examples include the following (syllable boundaries, which are not included in the original, are marked by a period; reduplicants are in boldface):

9 Healey (1960:10) suggests that “This type of reduplication is not active in the language, although there are many examples of its occurrence, and may best be regarded as derivational.” For this reason some linguists might prefer to by-pass this set of data. In my view the difficulty with dismissing examples of reduplication on these grounds is that the line between inflection and derivation can be exasperatingly difficult to draw in Austronesian languages, and ‘productivity’ is simply not a well-defined concept.
Although Healey is silent on this point, it is evident from the last two examples that the reduplicant contains phonologically conditioned allomorphs. If the first vowel of the base is high (represented below by $u$) the reduplicant is a copy of $V_1C$ with lowering of the vowel. However, if the first vowel of the base is low the reduplicant is a copy of $C_1V$ with metathesis of the copied segments, infixation immediately after the first consonant of the base rather than immediately before the last vowel, and raising of the copied vowel. Bases in which the first vowel is low can be analyzed as containing a prefixal allomorph of the reduplicative infix, thus $\text{talun} ‘forest’: i.-\text{t-e.t-a.lu.n-an} ‘forest dweller’$. Given the striking similarity of reduplicative affixation in both base classes, however, it seems preferable to view the reduplicative affix in CaCVC bases as infixal. This is the interpretation of Healey (1960), and I follow it here.

**Figure 2: Reduplicative Infixal Allomorphy in Agta Verbs and Nouns**

<table>
<thead>
<tr>
<th>First base vowel high</th>
<th>First base vowel low</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(C_1)u.C_2V_2C_3$</td>
<td>$(C_1)a.C_2V_2C_3$</td>
</tr>
<tr>
<td>$(C_1)u.C_2-o.C_2-V_2C_3$</td>
<td>$(C_1)-e.C_1-a.C_2V_2C_3$</td>
</tr>
</tbody>
</table>

While heavy syllable reduplication in most languages copies an open syllable plus a following onset, Agta infixal reduplication copies a syllable nucleus plus a following onset. One of the basic claims of Optimality Theory is the so-called ‘emergence of the unmarked’. As Kager (1999:215) puts it “An observation that has been made time and again … is that reduplicants eliminate segmental or prosodic markedness, whereas the same markedness is tolerated in any non-reduplicant in the language.” Surprisingly, even though Healey’s description of Agta is mentioned repeatedly in the general theoretical literature (Marantz 1982:439), Broselow and McCarthy 1983/84:27-28), Kager (1999:200, 216ff) infixal reduplication is treated with silence. This is unfortunate,
since infixal reduplication in Central Cagayan Agta presents a double challenge to the emergence of the unmarked. First, onsetless syllables, and particularly VC syllables, are universally marked, and the same is true in Agta. A perusal of the most extensive vocabulary available for this language (Oates and Oates 1955, with about 1,000 base forms) suggests that fewer than 10% of all syllables in the language have the shape VC, and probably half of these precede a geminate consonant. Rather than eliminating prosodic markedness then, infixal reduplication in Central Cagayan Agta increases it: from bases that have only V, CV and CVC syllables infixal reduplication creates VC reduplicants.

But his is only half of the story. Akan, a Kwa language of Ghana, is cited in the OT literature as a paradigm case illustrating the ‘emergence of the unmarked’ with regard to vowel height, since this language allows both high and mid vowels in bases, but only high vowels in reduplicants (Kager 1999:208ff). Central Cagayan Agta presents a very different picture. Healey (1960:3) describes this language as having five vowels, \(a, i, u, e\) and \(o\), of which the first three may occur long. Oates and Oates write differences of length for all vowels (including \(e\) and \(o\)), noting that \(a\) “is pronounced like the vowel in the English word ‘cup’, and \(aa\) like that in the word ‘far’.” Since the data in Healey (1960), Oates and Oates (1955) and Reid (1971) are said to represent the same dialect, forms such as Central Cagayan Agta \(t\)\(s\)\(l\)\(u\)\(n\) ‘woods (forest)’ in Reid (1971) imply that the forms \(l\)\(a\)\(v\)\(u\)\(n\)\(-an\) ‘guess’ and \(t\)\(a\)\(l\)\(u\)\(n\) ‘forest’ in Healey (1960) contain a schwa in the first syllable, and that it is this vowel rather than \(a/\) that raises when copied onto a reduplicative template. However this issue is resolved, it is clear that the mid vowels are far less frequent than high vowels or \(a/\). Many of these are found only in loanwords, as \(b\)\(a\)\(n\)\(d\)\(e\)\(e\)\(r\)\(a\)\(q\) ‘flag’, \(b\)\(i\)\(y\)\(e\)\(r\)\(e\)\(n\)\(es\) ‘Friday’, \(b\)\(o\)\(l\)\(s\)\(a\)q ‘pocket’, or \(o\)\(t\)\(o\)o ‘bus, car’. In native forms mid vowels generally have only one clear source, namely vowel crasis, as in \(*\)\(w\)\(a\)\(h\)\(i\)\(R\) > \(w\)\(e\)\(r\) (Healey 1960:6), \(w\)\(e\)\(e\)\(r\) (Oates and Oates 1955) ‘creek’, or \(*\)\(d\)\(a\)\(h\)\(u\)\(n\) > \(d\)\(o\)\(o\)\(n\) (Oates and Oates 1955) ‘leaf’. Yet in infixal reduplication both the high vowels \(i, u\) and the low vowel \(a\) (possibly schwa) become mid. Central Cagayan Agta infixal reduplicants thus increase both prosodic markedness and segmental markedness in relation to the base forms from which they are derived. Rather than an ‘emergence of the unmarked’, then, what this language shows is an ‘emergence of the doubly marked’. Add to this the variation in insertion algorithm for infixal reduplicants derived from \(a/\) as opposed to those derived from high vowels, and this language becomes a paradigm case for theoretical incorrigibility.
4.2 Woleaian

Woleaian, spoken in the Caroline islands of Micronesia, has an unusual pattern of affix formation that might be called ‘double reduplication’, exemplified by the following forms (Sohn 1975:103):

### Figure 3: Double Reduplication in Woleaian Verbs

<table>
<thead>
<tr>
<th>Stem</th>
<th>Reduplicated word</th>
</tr>
</thead>
<tbody>
<tr>
<td>shal ‘water’</td>
<td>chechal ‘to water’</td>
</tr>
<tr>
<td>rang ‘yellow powder’</td>
<td>chechang ‘apply powder’</td>
</tr>
<tr>
<td>liuwanee(-y) ‘think (it)’</td>
<td>niuniuwan ‘to think’</td>
</tr>
</tbody>
</table>

According to Sohn (1975:103) “the doubling of l, sh, r, g, and b results in a change in the quality of the respective consonants, as in n, ch, ch, k, and bb (stop sound bb in contrast with the fricative b).” Consonant doubling is a form of subtemplatic reduplication that exists independently in the language, as in bug(-a) ‘boil (it)’: bbug ‘boiled’. Forms such as chechal thus appear to result from two successive but inseparable reduplicative processes: 1. initial consonant doubling (shal > chal) and 2. reduplication of the first syllable of the base with regular cluster reduction and low vowel dissimilation (aCa > eCa), hence chchal > chachal > chechal, etc. (iu represents a high central rounded vowel). Because the result of this process appears to be a single isolable reduplicant it cannot be called triplication, and because there appear to be no semantic grounds for distinguishing the functions of these two layers of copying double reduplication in Woleaian appears to be distinct from what I have elsewhere called ‘serial reduplication’ in Thao (Blust 2001:332ff). What is most problematic for this process, however, is its relation to alignment.

One of the major claims of Prosodic Morphology that has been inherited by Optimality Theory is that morphological constituents must be aligned with prosodic boundaries. Languages with reduplicative consonant gemination, as Squliq Atayal qmayah ‘field’: qqmayah ‘all the fields’, or zik ‘below’: zzik ‘very deep’ (Zeitoun and Wu 2006) do not present a problem for this claim, but the Woleaian facts raise an issue that has received almost no attention in the general theoretical literature. Although reduplication is widely regarded as a type of affixation, and although morphology is viewed in broad typological perspective as being either agglutinative, inflectional/fusional or isolating, the relevance of this typology to reduplication normally goes unstated. This is probably because reduplicative morphology is overwhelmingly agglutinative. However, because most instances of reduplicative gemination in Woleaian result in a difference of consonant *quality* rather than duration, this
reduplication process has features of fusional morphology that make it difficult to clearly separate the reduplicant from the base. While che- and niu- are possible syllables in Woleaian, the reduplicants appear to be the larger strings chech- and niun-, since -chal, -chang, and -niuw are not base forms. In effect, then, the morpheme boundary lies within the segment derived by consonant doubling, both within the base and within the secondary reduplicant. In an attempt to cope with cases of prosodic misalignment that could not be explained by the earlier theory, Crowhurst (2004) has proposed a ‘mora alignment’ constraint that allows reduplicative affixation to make reference to moraic boundaries for purposes of affix insertion. However, even this emendation cannot cope with the Woleaian facts, since reduplication is expressed as a qualitative contrast rather than a contrast of segmental quantity.

Finally, it might be argued that even though double reduplication in Woleaian does not violate templatic requirements it results in syllables that do not occur in base forms. Although Cesh and Cach (where C = consonant) are possible syllables, Cecch apparently is unattested, since it could only arise word-finally from both low vowel dissimilation and final consonant doubling (chech ‘tremble’ is not a counterexample, as it contains an underlying final vowel that is devoiced word-finally). Cases like this are murky in the sense that ‘possible unit of prosody’ and ‘possible syllable’ are not coterminous. The PMH was indifferent to the segmental content of templates, but actual syllables cannot be, and although Cecch may fit neatly into a syllable template, it cannot in any segmentally specified inventory of types be called a possible syllable in the language.

5. Conclusions

As in any typology, a thoroughgoing typology of reduplication processes in natural languages probably will form a bell curve, with CV- and full reduplication accounting for the greatest number of tokens in cross-linguistic perspective. Less commonly encountered types of reduplication are of interest, however, both for their novelty and for the light they can shed on the range of natural typological variation. Supertemplatic reduplication in Formosan languages is of interest both for its novelty and for its relevance to general theoretical claims regarding prosodic constraints on possible reduplicants. The data from Central Cagayan Agta and Woleaian are likewise of interest for their novelty, but also for their relevance to theoretical claims regarding markedness and alignment. Given their radical divergence from typical patterns the languages examined here should be kept in mind with regard to the formulation of any future theoretical proposals regarding the nature and limitations of reduplication processes.
Acknowledgement

It is a pleasure for me to dedicate this paper to Paul Jen-kuei Li, who I have known since our student days together at the University of Hawai‘i, and who has made a remarkably sustained contribution to our knowledge of the Formosan aboriginal languages over a period of more than 30 years. I am indebted to Yuchau E. Hsiao, Tien-hsin Hsin, Shun-chieh Lu, and Elizabeth Zeitoun for providing access to references which were difficult for me to obtain while I wrote the first draft of this article during a one-year sabbatical leave in Taiwan, and to Kenneth L. Rehg and Juliette Blevins for comments which led to improvements in the present version. The usual disclaimers apply.

References


